

WHAT IS CLAIMED IS:

1. A composition for removal of residues from integrated circuits, which comprises a choline compound, water and an organic solvent.

2. The composition of claim 1 in which the composition comprises from about 10 percent by weight to about 50 percent by weight of the choline compound.

3. The composition of claim 2 in which the composition comprises from about 10 percent by weight to about 80 percent by weight of the water.

4. The composition of claim 3 in which the composition comprises from about 20 percent by weight to about 80 percent by weight of the organic solvent.

5. The composition of claim 1 in which the choline compound comprises choline hydroxide, choline bicarbonate or choline chloride.

6. The composition of claim 5 in which the choline compound is choline hydroxide.

7. The composition of claim 5 in which the organic solvent comprises propylene glycol, dimethyl sulfoxide, monoethanolamine, or diglycolamine.

8. The composition of claim 1 in which the composition additionally comprises hydroxylamine.

9. The composition of claim 1 in which the composition additionally comprises a corrosion inhibitor.

10. A process for the removal of a residue from an integrated circuit, which comprises contacting the integrated circuit with a composition comprising a choline compound, water and an organic solvent at a temperature and for a time sufficient to remove the residue from the integrated circuit.

11. The process of claim 10 in which the composition comprises from about 10 percent by weight to about 50 percent by weight of the choline compound.

5 12. The process of claim 11 in which the composition comprises from about 10 percent by weight to about 80 percent by weight of the water.

13. The process of claim 12 in which the composition comprises from about 20 percent by weight to about 80 percent by weight of the organic solvent.

10 14. The process of claim 13 in which the choline compound comprises choline hydroxide, choline bicarbonate or choline chloride.

15. The process of claim 14 in which the choline compound is choline hydroxide.

15 16. The process of claim 10 in which the process includes the steps of forming a first silicon compound etch stop layer over a copper conducting line in the integrated circuit, forming a second silicon compound bulk dielectric over the first silicon compound etch stop layer, etching the second silicon compound bulk dielectric to expose the etch stop layer, removing residues from the integrated circuit, etching away the etch stop layer to expose the  
20 copper conducting line, and removing residues from the integrated circuit in accordance with claim 7.

25 17. The process of claim 10 in which the composition additionally comprises hydroxylamine or a hydroxylamine salt.

18. The process of claim 10 in which the composition additionally comprises a corrosion inhibitor.

30 19. An integrated circuit fabrication process, which comprises forming a first silicon compound etch stop layer over a copper conducting line in the integrated circuit, forming a second silicon compound bulk dielectric over the first silicon compound etch stop layer, etching the second silicon compound bulk dielectric to expose the etch stop layer, removing residues from the integrated circuit, etching away the etch stop layer to expose the copper conducting line, and removing residues from the integrated circuit with a residue  
35 removal composition containing an effective amount of a choline compound.

20. The integrated circuit fabrication process of claim 19 in which the first silicon compound etch stop layer comprises silicon nitride.

5 21. The integrated circuit fabrication process of claim 20 in which the second silicon compound etch stop layer comprises silicon oxide.

22. The integrated circuit fabrication process of claim 21 in which the choline compound comprises choline hydroxide, choline bicarbonate or choline chloride.

10 23. The integrated circuit fabrication process of claim 22 in which the choline compound is choline hydroxide.

15 24. The integrated circuit fabrication process of claim 20 in which the residue removal composition additionally includes water.

25 25. The integrated circuit fabrication process of claim 24 in which the residue removal composition comprises from about 10 percent by weight to about 50 percent by weight of the choline compound.

20 26. The integrated circuit fabrication process of claim 25 in which the composition comprises from about 10 percent by weight to about 80 percent by weight of the water.

25 27. The integrated circuit fabrication process of claim 24 in which the composition additionally includes an organic solvent.

28. The integrated circuit fabrication process of claim 27 in which the organic solvent comprises propylene glycol, dimethyl sulfoxide, monoethanolamine, or diglycolamine.

30 29. The integrated circuit fabrication process of claim 27 in which the composition additionally comprises hydroxylamine.

35 30. The integrated circuit fabrication process of claim 27 in which the composition comprises from about 10 percent by weight to about 50 percent by weight of the choline compound, from about 10 percent by weight to about 80 percent by weight of the water, and from about 20 percent by weight to about 80 percent by weight of the organic solvent.

31. The integrated circuit fabrication process of claim 27 in which the composition additionally comprises a corrosion inhibitor.

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